Infrastructure Design
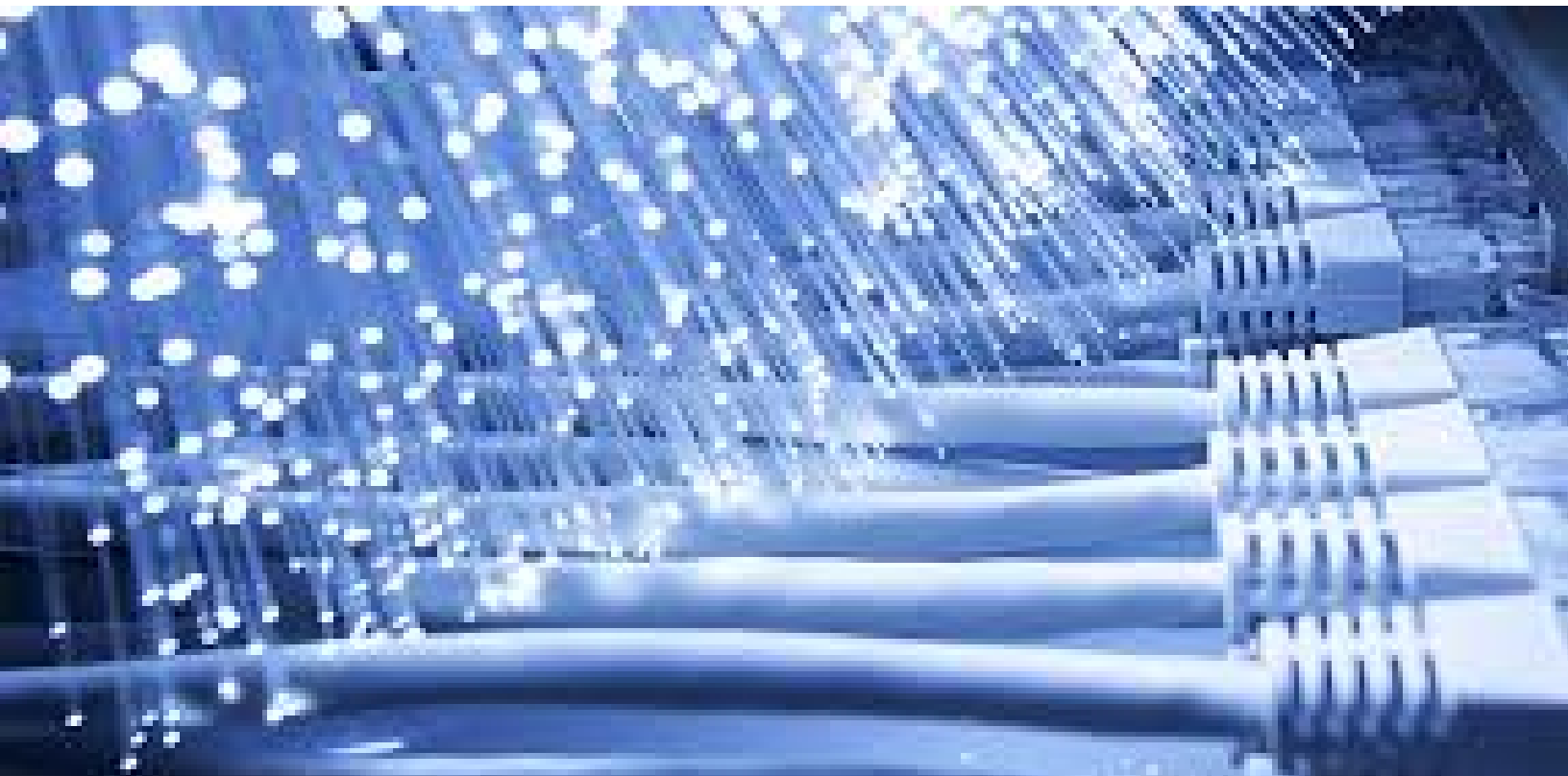
West Des Moines 10 GB Network Upgrade

Technical White Paper

| System & Master Planning | Network Design & Architecture | **Infrastructure Design** | Network Operations & Maintenance (NOM) | Integration & Troubleshooting | Training |

gbaSI was retained to improve the existing City of West Des Moines, Iowa's gigabit fiber optic network infrastructure and to integrate and redesign it into a 10 Gigabit mesh network backbone. gbaSI has a long-term design and integration relationship with the City and this enhancement project is a continuation of our commitment to provide infrastructure design and network engineering support for the improvement of overall network performance and efficiency.

Situation

The City of West Des Moines, Iowa traffic network has been using Ethernet communication over fiber optic cables since early 2005. The network was intended to provide IP based data communication to over 115 traffic signal controllers, serial interfaces, vehicle detection units, video surveillance cameras, and many other IP-based network components. The continued addition of more IP-based cameras, network devices, and the implementation of modern management tools require greater bandwidth, second-by-second network communication, improved reliability, and enhanced overall network robustness. Network reliability and maximum up-time are critical to the success of the WDM traffic network infrastructure.

The gbaSI team was tasked by the City Public Works staff to design, integrate and optimize the core backbone network infrastructure to 10 GB capability .

Solution

Enhanced Network Core

Over the years, the City of West Des Moines traffic network has growth rapidly. The new 10 GB network optimization project improved overall network capability, bandwidth, and robustness. The network architecture is now up to date with latest technology, more secure, has higher bandwidth, and more redundant network infrastructure so City technicians and engineers can easily access network devices and systems. The updated network provides enhanced bandwidth for real-time traffic monitoring, surveillance camera system, and traffic adaptive system, etc. All devices on the network operate with near real-time second-by-second network communication with maximum up-times for network reliability.

Our dedicated network support engineers are responsible for assisting WDM with the daily maintenance, installation, testing, and troubleshooting tasks to support the network operating systems. Since network reliability is crucial to daily operation, gbaSI performs remote and onsite network monitoring diagnostics and preventive maintenance to ensure that the network operates with maximum uptime, reliability, scalability, security, and at peak performance.

Results

Improved Operations

This reliable and scalable network has been designed to support over Eighty (80) high resolution video streams and PTZ camera control using TCP/IP protocol. In addition, the overall system supports over 150 IP-based traffic controllers, UPS units, Traffic Responsive data communication, and video detection camera systems.

The Traffic Operation Center (TOC) has the capability of to monitor and manage any network device or system via remote access via secure VPN. Additionally, technicians and engineers can monitor operations of the communication network using SNMPc network monitoring tools from any traffic management workstation. The TOC architecture supports multi-users mobile devices, wall-mount monitors, and Genetec XProtect Smart Client software for video monitoring. gbaSI supports the WDM and can remotely monitor the traffic system to aid in trouble shooting issues from a remote location. This robust network provides everything a customer needs to operate, maintain, and support the system anywhere, anytime.

Conclusion

West Des Moines Traffic Communications system now functions with a fully redundant, 10 GB fiber based backbone IP network. All routed communications operate on the new 10 GB core and all field devices are linked at a minimum of 1 GB data transfer rates. This high speed, high capacity network allows the City to deploy and test new technologies and systems without fear of overwhelming the network capabilities. Additionally, WDM has built a communication system that provides enhanced security and redundancy to ensure high confidence in the ability of the City to manage and monitor their signal assets.

The City of West Des Moines recently won the "Best of ITS Award" from ITS Heartland for their implementation of Adaptive Signal Control Systems.

Without the high speed, high capacity core communication system, the adaptive signal controls would not function at award winning levels.

gbaSI - your friend in specialty technology

System & Master Planning – This is the first step in understanding and developing a modern communications and system management network. Without a plan, it just a parade of projects that may or may not work together in harmony and provide the results intended.

Network Design & Architecture – "The Intelligent application of the newest technologies and procedures to make you system operate efficiently". If only it was that easy – continued operation and support of legacy systems and hardwares, while taking advantage of new technologies, make the design of the network architecture the most critical link in the development of your system.

Infrastructure Design – Creating design plans that meet the requirements of funding agencies and provide the needed information for the proper installation of physical assets is a fundamental component of all wide area management and communication networks. Our licensed professional engineers understand how to make this happen efficiently.

Network Operations & Maintenance (NOM) – "Technology installed but not maintained in misplaced technology." Just because you built a great communication and management system, doesn't mean it will always work as intended or when needed. The ongoing monitoring and review of any operational management system is critical if you intend to utilize said network when it's really needed.

Field Integration & Troubleshooting – The best installed and maintained system will eventually meet with unintended issues. Have a plan on how to mitigate and respond to periodic breakages and device failures – our trained and certified staff can help.

Training – Experience has taught that most technologies are not utilized to anywhere near their capabilities or capacities. This is often due to the fact that system operators don't know what the new systems are capable of doing. Trained staff can maximize the benefit of any technology or system.

Communications & Technology

by Design